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No. XVIII.

Description of a Fragment of the Head of a New Fossil Animal, discovered in a Marl Pit, near Moorestown, New Jersey. By Isaac Hays, M.D.

I am indebted for the opportunity of describing this specimen to my friend Mr Isaac Lea, whose zeal in the cause of science is too well known to require any eulogium from me. It was found by Mr Joseph Brick in Inskeep's marl pit, on Pensauken creek, 5 miles south east of Moorestown, New Jersey; and was presented by J. J. Spencer, M.D. of Moorestown to Mr Lea, in whose valuable cabinet it is at present. The marl in which it was found is of that description called fine green marl: the stratum is about ten feet thick, and commences about two feet from the surface. In this stratum are found marine shells, (principally terebratulæ) shark's teeth, &c.

The only part of this animal yet discovered is the fragment in the possession of Mr Lea, consisting of a portion of the head and lower jaw. Some of the bones are in a tolerable state of preservation; others are covered with marl which has become too hard to be removed, or are so mutilated that they cannot be satisfactorily made out.

About three inches and four-tenths of the anterior portion of the lower jaw are preserved; the two sides are nearly parallel; anteriorly they are slightly mutilated—appear to have been very little rounded, and in contact; inferiorly, through the whole extent of the fragment, they are in con-

tact, and appear to be united by suture; posteriorly on each there is a smooth, shallow cavity, represented in Pl. XVI. Fig. 3, *d. d.* Near the posterior extremity there is an appearance of suture, which is most distinct on the left side, and which in all probability marks the union of the dental with the coronoid bone. The angular bones cannot be very distinctly made out; there is, however, on the left side near the base, and along the whole extent of the specimen, an indication of suture, which I have no doubt is the union of the angular and dental bones.

The dental bone contains a single row of distinct alveoli, continued in front, for the teeth; just below the alveolar border there is a series of foramina, one foramen to each alveolus, for the transmission of the inferior maxillary nerve and the blood vessels to the teeth. The teeth of the lower jaw (and in the present specimen part of the dental bone, owing perhaps to its being crushed) close within the upper.

Just within the dental bone, on the left side, there projects a rectangular portion of bone, Fig. 2, and 4, *s.* belonging to the upper jaw: its character and analogies are not very evident; it is deficient on the right side.

The intermaxillary bones are very distinct, and are seen in Fig. 1, 2, and 4, *b.*; they are united posteriorly by squamous suture to the upper maxillary, and a bone which appears to be the lachrymal. Anteriorly the intermaxillaries are rounded, and separated about one-tenth of an inch; the anterior inferior portion of each is mutilated, but the alveoli for the teeth are conspicuous, and from their direction we are led to infer that the upper front teeth project beyond the lower; the posterior inferior portions of this bone, each side, contain four or five teeth.

Between the intermaxillary and upper maxillary bones on each side, and covered principally by the former, is a bone, Figs. 1, and 2, *g.* (the lachrymal probably,) in the anterior portion of which is a deep groove, Fig. 2, *f.* passing forwards and downwards, and becoming smaller as it descends; on the upper portion of each of these bones there

is a small, smooth, superficial groove, Fig. 2, *h*, and on its inner side, a small, smooth, slightly convex, apparently articulating surface, Fig. 2, *i*.

The general figure of the upper maxillary bone will be better understood by a view of the drawing, Fig. 1, *c*. than by any verbal description; this bone is imperfect posteriorly. Superior and anteriorly, near its junction with the last described bone, the upper maxillary has a smooth, apparently articulating surface, convex antero-posteriorly, and inclining a little inwards, Fig. 2, *g*.; like the dental and intermaxillary bones, this has also distinct alveoli for the teeth; and near its alveolar margin, on the inner surface, there is a regular series of foramina, similar to those in the dental bone, for the transmission of the superior maxillary nerve and vessels to the teeth. The external surface of this bone and also of the intermaxillary, where not broken, presents a shagreened appearance.

The teeth in both jaws are placed close together, in a single row, in distinct alveoli; they are also similar, those in the lower jaw, however, being rather more compressed than those of the upper: the anterior teeth of the lower jaw are smaller than the posterior. The crowns of the teeth are enamelled, smooth, lanciform, slightly inclined inwards; those at the posterior portion of the lower jaw slightly curved forwards. Their roots are hollow, slightly grooved on their external aspect; on their internal aspect there is a very slight groove. See section magnified three times, Fig. 10.

The young teeth grow into the hollow of the old. The mode of dentition is shown in Fig. 5; *l*. is the new tooth, *m*. the old.

There appear to have been nine or ten teeth in each intermaxillary, and about thirty in each upper maxillary bone; we are unable to ascertain satisfactorily the number of teeth in the lower jaw.

This animal, though its head bears some resemblance to, evidently does not belong to the great Saurian family, (*La-*

certa Linn.), since in all that family, except the crocodile and the Saurian of Luneville discovered by Dr Gaillardeau, the teeth are not lodged in alveoli, or even in a continuous furrow; on the contrary the jaw bone presents only a sort of parapet on the outer side—the teeth are fixed to the jaw by a bony mass, occupying the place of their root, and incorporated organically both with the tooth and with the jaw bone—and the new teeth make their first appearance in cells from within this osseous mass, and shoot irregularly through its substance, gradually producing a necrosis in it, thus causing both the mass and the old tooth to fall out.

This animal differs from the crocodile in the composition of its jaw, in the form and position of its teeth, in the mode in which the nerves and blood vessels are transmitted to the teeth, &c. &c. It differs from the Saurian of the environs of Luneville in the form and character of the teeth, which in the latter are conical, strongly striated, and alternately larger and smaller—also in the mode in which the blood vessels are transmitted to the teeth, &c.

It most probably belongs to the order *Enalio Sauri* of Conybeare; an order formed for certain animals which approaching more closely to the Saurian or Lizard family, and especially to the genus Crocodile, than to any other recent type, yet recede from it in many important characters, especially in the form of their paddles, which possess an intermediate structure between the feet of quadrupeds and the fins of fishes*.

It is impossible, however, to place the animal which forms the subject of this communication in any of the hitherto described genera of this order. It is excluded from the genus *Ichthyosaurus* by the composition of its jaw; by the teeth in the latter being placed in a sulcus and not in distinct alveoli, and also by the nerves and blood vessels being transmitted to the teeth of the lower jaw by perforations on the *outside* of the anterior portion of the dental bone, &c.

* See Geological Transactions, Vol. I. N.S. p. 561.

It differs from the *Plesiosaurus* in the form and relative size of the intermaxillary and upper maxillary bones—in the form of the lower jaw—form of the teeth—mode in which they close—and manner in which the lower maxillary nerve is transmitted to the teeth, which, in the *Plesiosaurus*, is by foramina dispersed irregularly along the outer edge of the lower jaw.

It appears most nearly to approach the *Saurocephalus*, a genus founded on a single dental bone, discovered in a cavern on the river Missouri, near Soldiers' river, by Sergeant Gass, who accompanied Lewis and Clark in their expedition, and presented by the latter gentleman to the Society, and now in their cabinet*. It resembles this animal in the teeth closing like incisors—in the foramina for the transmission of nerves and blood-vessels to the teeth of the lower jaw being in a regular series on the inner side of the dental bone near the alveolar edge—and in the young teeth entering the old directly in the centre and not at the side, as in the other animals of this order, in the Crocodile, &c.

It differs however from the *Saurocephalus* in the teeth being in distinct alveoli, while the teeth in the latter are described as being "fixed in a longitudinal groove" "in close contact throughout," "there being *no* distinct alveoli." Our animal differs also in the groove on the inside of the dental bone for the accommodation of the inferior maxillary nerve (and which is made a generic character) being absent, in the form of the teeth, and no doubt in many other particulars, which a want of opportunity for comparison and more perfect specimens makes it impossible for us to point out.

Under these circumstances we venture to propose for it a new genus, under the name of SAURODON, and will dedi-

* We regret much not having an opportunity of examining this specimen : we are compelled to depend upon the account of it by Richard Harlan, M.D. in the Journal of the Academy of Natural Sciences of Philadelphia, Vol. III. Part II.

cate the species to our friend Mr Lea, by the designation *Leæ*.

We hesitate attempting to indicate the generic and specific characters with the imperfect knowledge we possess of all the animals of the order to which it belongs; and at all events will postpone doing so till we can collect more complete remains of our animal.

Since I had the honour of laying before the society the description of a portion of the head of a new fossil animal from New Jersey, I have had an opportunity of examining the fossil organic remain in the cabinet of the society, presented by Lewis and Clark. I find that this specimen consists not only of a portion of a dental bone, but also a small part of a coronoid bone; and that the teeth, instead of being "in a longitudinal groove" "in close contact throughout," "there being no distinct, separate alveoli," *are in fact placed in distinct alveoli*.

The most important generic character which was supposed to distinguish this animal from the one we described having thus no existence, it appears proper in the present state of our knowledge to place the two species in the same genus; and, as the genus *Saurocephalus* is founded on erroneous characters, and will not admit our species, it becomes necessary to construct a new genus, which we shall accordingly do, and shall retain for it the name SAURODON.

Genus *Saurodon* (*Hays*). Teeth of the lower jaw closing within those of the upper, like incisors; a regular series of foramina along the inner aspect of the jaws near their alveolar margins, for the passage of nerves and blood-vessels to the teeth.

Species 1. *S. lanciformis*. A groove along the inner

surface of the dental bone for the accommodation of the inferior maxillary nerve; teeth very obtusely lanciform.

Species 2. *S. Leanus*. Teeth acutely lanciform, much smaller than in the preceding species, slightly curved.

Saurodon Leanus.—PLATE XVI.

Fig. 1.—Fragment of head, lateral view. *a*. Dental bone. *b*. Intermaxillary bone. *c*. Upper maxillary bone. *g*. Lachrymal bone.

Fig. 2.—Head seen from above. *b. b.* Intermaxillary bones. *e*. Teeth of under jaw. *f. f.* Nasal grooves. *g. g.* Lachrymal bones. *h*. Small groove. *i*. An articulating surface. *q*. An articulating surface of upper maxillary bone.

Fig. 3.—Posterior view. *d. d.* Glenoid cavities in coronoid bone.

Fig. 4.—Anterior view. *o*. Foramina in dental bone for transmission of nerves and blood-vessels to the teeth.

Fig. 5.—Portion of upper jaw, with the outer lamina of bone removed to show the mode of dentition, magnified three times. *l. l.* New teeth. *m. m.* Old teeth. *p*. Empty alveolus.

Fig. 6.—Portion removed from posterior part of upper jaw, right side—internal aspect, magnified three times. *o*. Foramina for transmission of nerve and blood vessels to teeth. *p*. Empty alveolus.

Fig. 7.—Tooth, removed from alveolus *p*. Fig. 6, inner aspect.

Fig. 8.—Same tooth, external aspect.

Fig. 9. Ditto side view.

Fig. 10. Ditto section of the root.

Fig. 11.—*Saurodon lanciformis*. Portion of dental bone, external lamina removed so as to show the alveoli and form of the teeth, magnified three times.

Read December 4, 1829; and January 1, 1830.

PL. XVI.

